IN THE CLAIMS – Following is the list of claims and their status:

These claims have been renumbered as 19-35 in accordance with 37 C.F.R. §1.126, as stated in Paragraph 1 of page 2 of the Office Action.

19. (Previously Presented) A method for determining a precompensated pattern of exposure doses of an electron beam required per pattern position to obtain a desired pattern in a coating on a substrate, the method comprising the steps of:

determining a smearing function of the electron beam; and

determining a precompensated pattern with the smearing function and a desired pattern, wherein the determination is performed such that electron beam exposure doses contain almost exclusively positive values and that the electron beam exposure doses are smooth relative to each other, wherein the step of determining the precompensated pattern comprises the steps of:

a) estimating a regularization parameter;

b) determining a precompensated pattern with all pattern points of the desired pattern with the exception of a determined pattern point;

c) smearing the precompensated pattern again with the smearing function in order to predict the dose of the determined pattern point;

d) repeating steps b) and c) for each pattern point;

e) repeating steps a) to d) with an adapted regularization parameter until a final value of a regularization parameter is obtained; and

f) determining the precompensated pattern with the final value of the regularization parameter.

20. (Previously Presented) The method as claimed in claim 21, wherein step b) is determined utilizing the following iterative equation:

$$d^{(\ell)} = d^{(\ell-1)} + (K^{v}K + \lambda B(D))^{-1} K^{v} r^{(\ell-1)} \qquad r^{(\ell)} = a - Kd^{(\ell)}$$

with $d^{(0)} = 0$ and $r^{(0)} = a$

wherein a is a vector with the doses of the desired pattern as elements, d is a vector with the exposure doses of the precompensated pattern, K is the smearing function in matrix form, K^{v} is the Hermitian conjugate of the smearing function K, B is an operator and λ a regularization parameter.

21. (Previously Presented) The method as claimed in claim 22, wherein the operator B is defined as follows:

$$B(D) = \sum_{i} \left(\frac{d_i}{d_{tot}} \right) \ell n \left(\frac{d_i}{d_{tot}} \right)$$

in which the summation takes place over all pattern points, d_1 is the i^{th} element of the vector d, and d_{tot} represents the summation over all elements of the vector d.

22. (Previously Presented) The method as claimed in claim 21, wherein the final value of the regularization parameter in step e) is the regularization parameter

$$\frac{1}{N} \sum_{k=1}^{N} \left(a_k - \left[Kd_k(\lambda) \right]_k \right)^2$$

wherein N is the total number of pattern points, a is a vector with the doses of the desired pattern as elements, d is a vector with the exposure doses of the precompensated pattern and K is the smearing function in matrix form.

23. (Previously Presented) The method as claimed in claim 21, wherein the final value of the regularization parameter in step e) is the minimal regularization parameter

$$\frac{1}{N}\sum_{k=1}^{N}\left(a_k - \left[Kd^k(\lambda)\right]_k\right)^2 W_{kk}(\lambda)$$

wherein N is the total number of pattern points, a is a vector with the doses of the desired pattern as elements, d is a vector with the exposure doses of the precompensated pattern, K is the smearing function in matrix form and w_{kk} is defined as:

$$W_{kk}(\lambda)=\left[\frac{1-a_{kk}(\lambda)}{1-\frac{1}{N}\sum_{j=1}^{N}a_{jj}(\lambda)}\right]^2$$

with a_{kk} the elements of the matrix $A = K(K^TK+\lambda L(D)^TL(D))^{-1}K^T$ and L the Laplace operator.

24. (Previously Presented) The method as claimed in claim 21, wherein after step e) the step is performed of training a neural network using one or more desired first patterns and the associated precompensated patterns.

25. (Previously Presented) The method as claimed in claim 26, wherein the precompensated pattern associated with a second desired pattern can be determined with the trained neural network.

26. (Previously Presented) The method as claimed in claim 27, wherein the first desired pattern is a relatively simple training pattern and the second desired pattern is a partial pattern of an integrated circuit.

27. (Previously Presented) The method as claimed in claim 28, wherein two or more partial patterns can be combined into a composite pattern of the integrated circuit.

28. (Previously Presented) The method as claimed in claim 26, wherein the neural network is a radial base function network.

29. (Previously Presented) The method as claimed in claim 26, wherein the neural network is implemented in hardware.

30. (Previously Presented) The method as claimed in claim 31, wherein the neural network is implemented in analog hardware.

31. (Previously Presented) The method as claimed in claim 21, wherein the smearing function is made up of at least two Gaussian functions.

32. (Previously Presented) The method as claimed in claim 33, wherein an exponential function is added to the smearing function.

33. (Previously Presented) The method as claimed in claim 33, wherein the parameters of the Gaussian functions can be determined using statistical simulations.

34. (Previously Presented) The method as claimed in claim 33, wherein the parameters of the Gaussian functions can be determined by measurements.

35. (Currently Amended) A device for determining the exposure dose of an electron beam required per pattern position to obtain a desired pattern in a coating on a substrate, comprising electronic circuit means for implementing a neural network having weighting factors determined by training the neural network by using as inputs one or more desired patterns and corresponding precompensation patterns determined by the steps of:

a) estimating a regularization parameter;

b) determining a precompensated pattern with all pattern points of the desired pattern with the exception of a determined pattern point;

c) smearing the precompensated pattern ~~again~~ with ~~the~~ a smearing function in order to predict the dose of the determined pattern point;

d) repeating steps b) and c) for each pattern point;

e) repeating steps a) to d) with adapted regularization parameter until a final value of a regularization parameter is obtained; and

f) determining the precompensated pattern with the final value of the regularization parameter.